

AUG.5.1980 CALGARY ALBERTA

DEAR ROBERT

AS YOU CAN SEE I FINALY GOT A TYPEWRITER.

AS PROMISSED EARLIER THIS YEAR I HAVE CALLED ALL NUMBERS FROM 0 to 32767 A LIST OF THE BEST ONES IS ENCLOSED. THE ONES THAT ARE NOT INCLUDED ARE ONES THAT RESET,LOCK,SHOW NOTHING ON THE SCREEN AND THE ONES THAT ARE RESETS, LOCKS THAT ARE REPEATS.

I HOPE I HAVE NOT MADE TO MANNY SPELLING MISTAKES AS I AM GERMAN AND MY ENGLISH IS SELF TAUGHT.

I HAVE ALSO INCLUDED A TABLE OF CONTENTS FROM A BALLY BOOKLET, SOMEONE LET ME COPY, TOTALING 63 PAGES. I DID NOT SEND A WHOLE COPY AS YOU MIGHT HAVE IT ALREADY.

IF YOU WOULD LIKE A COPY, STAPLE A NOTE TO MY NEXT NEWSLETTER OR WRITE YES OR NO ON THE NEWSLETTER AND IF YES I WILL SEND YOU A COPY.

SO TILL THEN

MAY ARCADIANS PROSPER

YOURS TRULY



DIETER HEINERMANN

TABLE OF CONTENTS

| | |
|--|----|
| INTRODUCTION - - - - - | 1 |
| MEMORY MAP - - - - - | 2 |
| SCREEN MAP - - - - - | 5 |
| COLLOR MAPPING - - - - - | 8 |
| INTERRUPT FEEDBACK - - - - - | 12 |
| INTERRUPT CONTROL BITS - - - - - | 12 |
| SCREEN INTERRUPT - - - - - | 13 |
| LIGHT PEN INTERRUPT - - - - - | 13 |
| MAGIC REGISTER - - - - - | 14 |
| EXPAND - - - - - | 15 |
| SHIFTER - - - - - | 16 |
| FLOPPER - - - - - | 16 |
| ROTATOR - - - - - | 18 |
| OR and XOR - - - - - | 20 |
| INTERCEPT - - - - - | 20 |
| PLAYER INPUT - - - - - | 21 |
| MASTER OSCILLATOR - - - - - | 23 |
| TONES - - - - - | 24 |
| SOUND BLOCK TRANSFER - - - - - | 24 |
| OUTPUT PORTS - - - - - | 26 |
| INPUT PORTS - - - - - | 27 |
| SYSTEM DIAGRAM - - - - - | 28 |
| MICROCYCLER - - - - - | 29 |
| ADDRESS CHIP DESCRIPTION - - - - - | 31 |
| DATA CHIP DESCRIPTION - - - - - | 34 |
| I/O CHIP DESCRIPTION - - - - - | 37 |
| MUSIC PROCESSOR - - - - - | 39 |
| CUSTOM CHIP TIMING - - - - - | 43 |
| VIDEO TIMING - - - - - | 51 |
| ELECTRICAL SPECIFICATION for - - - - - | 55 |
| MIDWAY CUSTOM CIRCUITS | |

ALL NUMBERS WHERE CALLED WITH(), WITHOUT(), WITH&(9)=5, WITH 10 INPUT A
20 CALL A AND A PROGRAM THAT APEARS BELOW.

```

5 INPUT A
10 NT=1
20 BC=9;FC=7
30 &(9)=5
40 &(0)=96
50 &(1)=205
60 &(2)=130
70 &(3)=169
80 CLEAR
90 A=A+1;B=A;GOSUB 110
100 GOTO 90
110 CX=0;CY=30;PRINTB;CALLB;STOP;RETURN

```

EXPLANATION TO ABBREVIATIONS

WBB =WHAT? BALLY BASIC

BTBB =BACK TO BALLY BASIC

G =GOOD(CRUSOR APEARS ON NEXT LINE OR AFTER PRINTED MATERIAL)

LOCK =LOCKED KEYBOARD CAN NOT RETURN TO BASIC

IF YOU DECIDE TO USE ANY GOOD CALLS, TRY THEM FIRST WITH A SHORT
PROGRAM. MAKE SURE THEY WILL WORK WITHOUT CHANGING THE PROGRAM
THAT YOU HAVE WRITTEN.

SOME CALLS THAT WILL NOT WORK WITH YOUR PROGRAM CAN BE CALLED
FIRST, THEN CLEARD (NOT RESET), THEN MAKE &(9)=0 AND WHATEVER
WAS CALLED WILL REAPPEAR.

NOTE 1

WAIT FOR A FEW SECONDS THEN WBB SHOULD APEAR IF NOT CALL SAME
NUMBER AGAIN. YOU WILL SEE A MEMORY DISPLAY ON TOP OF THE SCREEN
THEN IT WILL PRINT WBB. PRESS WORDS GO WATCH MEMORY DISPLAY.

NOW PUT IN PRINT"1111 WORDS GO,NOW LIST.TRY LIST AFTER WBB APEARS.

I HOPE YOU WILL FIND SOMETHING OF INTREST OR USE TO YOU IN YOUR
PROGRAMS.SO HAPPY HUNTING.

| | | | |
|-------|-------------|----------------|------|
| 463 | red | flash | G |
| 465 | blue | " | G |
| 466 | red | " | G |
| 467 | " | " | G |
| 468 | " | " | G |
| 469 | " | " | G |
| 470 | green | " | G |
| 471 | yellow | " | G |
| 472 | red | " | G |
| 625 | interesting | memory display | LOCK |
| (975) | &(9)=10 | | G |
| 1288 | sound | | G |
| 1290 | " | | G |
| 1294 | " | | G |
| 1299 | " | | G |
| 1302 | " | | G |
| 1306 | " | | G |
| 1307 | " | | G |
| 1308 | " | | G |
| 1309 | " | | G |
| 1310 | " | | G |
| 1315 | " | | G |
| 1316 | " | | G |
| 1318 | " | | G |
| 1319 | " | | G |
| 1370 | " | | G |
| 1374 | " | | G |
| 1376 | " | | G |
| 1378 | " | | G |
| 1381 | " | | G |
| 1387 | " | | G |
| 1389 | " | | G |
| 1394 | " | | G |
| 1397 | " | | G |
| 1400 | " | | G |

1402 sound G
1403 " G
1413 " G
1414 " G
1426 " G
1428 crasy print WBB
1429 " " WBB
1430 " " WBB
1432 sound G
1433 crasy print WBB
1434 sound G
1435 " G
1436 " G
1437 " G
1438 " G
1439 " G
1459 crasy print WBB
1460 sound G
1461 " G
1468 " G
1469 " G
1470 " G
1472 crasy numbers if kp WBB
1475 sound G
1476 " G
1478 crasy print WBB
1480 sound G
1481 " G
1482 " G
1483 " G
1485 " G
1486 " G
1495 " G
1496 " G
1500 " G

1502 sound G
1503 " G
1504 " G
1505 " G
1533 " G
1535 " G
1536 " G
1539 " G
1734 **crasy caracters** G
1739 " G
1740 " G
1742 " G
1743 " G
1744 " G
1745 " G
1746 " G
1749 " G
1751 " G
1752 " G
1753 " G
1754 " G
1756 " G
1757 " G
1758 " G
1759 " G
1760 " G
1761 " G
1814 interesting display lock
1959 crasy print WBB
2193 calculator +sound G
3137 game over lock
3172 menu G
3174 " G with 10input A 20callA
3177 " G

3195 menu green background if kp reset
3196 " " " " " "
3197 " " " " " "
3198 " " " " " "
3199 " " " " " "
3200 " " " " " "
3207 menu black+white " "
3233 giant 1 lock
3327 enter xs 2&n lock
3328 " " " lock
3424 game over lock
3609 emter # of players if kp reset
3610 part of scribbling collar keys operate if kp reset
3611 " " " " " " " " " " "
3612 " " " " " " " " " " "
3813 crasy print WBB
3821 blue screen lock
3851 puts a box om screen WBB
3852 " " " " " " WBB
3853 " " " " " " WBB
3854 " " " " " " WBB
3859 " " " " " " G
3861 " " " " " " G
3862 " " " " " " G
3863 " " " " " " G
3865 " " " " " " G
3866 " " " " " " G
3869 " " " " " " G
3870 " " " " " " G
3982 wagon cactus cowboy G with 10input A 20call A
4128 calculator G
4138 varies &(9) WBB
4161 " " " WBB
4164 " " " WBB
4630 scroll screen up WBB

4659 move up one line WBB
4671 down one line WBB
4672 " " " WBB
4673 up one lime WBB
4685 scroll screen up WBB
4692 " " " " WBB
4693 " " " " WBB
4705 down ome lime WBB
4706 " " " WBB
4709 scroll down interesting display WBB
4710 " " " " " WBB
4908 checkmate computer self G
4909 " " " " " G
4910 " " " " " G
4911 " " " " " G
4912 " " " " " G
4915 " " " " " G
4916 " " " " " G
4917 " " " " " G
4918 " " " " " G
4919 " " " " " G
4920 " " " " " G
4921 " " " " " G
4922 " " " " " G
4923 " " " " " G
4924 " " " " " G
4925 " " " " " G
4928 " " " " " G
4929 " " " " " G but starts with black+white
4933 checkmate put in your own collor LOCK no game
4934 " " " " " " " LOCK " "
4935 " " " " " " " LOCK " "
4980 " " " " " " " LOCK " " HORIZONTAL
5008 " " " " " " " LOCK " " HORIZONTAL
BARRS CONTROL WITH KEYBOARD UP OR DOWN AND SPEED

| | | |
|------|---|------|
| 5258 | &(9) solid | WBB |
| 5261 | " " " | WBB |
| 5264 | sound | G |
| 5265 | " | G |
| 5266 | " | G |
| 5271 | " | G |
| 5274 | " | G |
| 5277 | " | G |
| 5278 | " | G |
| 5279 | " | G |
| 5281 | " | G |
| 5282 | " | G |
| 5283 | " | G |
| 5286 | " | G |
| 5287 | " | G |
| 5291 | " | G |
| 5300 | crash+crasy print | WBB |
| 5307 | " " " " | WBB |
| 5308 | " " " " | WBB |
| 5309 | " " " " | WBB |
| 5310 | " " " " | WBB |
| 5311 | " " " " | WBB |
| 5327 | " " " " | WBB |
| 5329 | " " " " | WBB |
| 5335 | " " " " | WBB |
| 5337 | " " " " | WBB |
| 5345 | collor+sound+crasy print if crusor touch bottom | LOCK |
| 5350 | " " " " " " " " " | LOCK |
| 5359 | " " " " " " " " " | LOCK |
| 5360 | " " " " " " " " " | LOCK |
| 5367 | crasy print sound | WBB |
| 5368 | " " " " " | WBB |
| 5369 | " " " " " | WBB |
| 5370 | " " " " " | WBB |
| 5388 | " " " " " | WBB |

5389 crasy print sound WBB
5390 " " " " WBB
5391 " " " " WBB
5393 " " " " G
5394 " " " " G
5398 " " " " G
5399 " " " " G
5400 " " " " G
5401 " " " " G
5402 " " " " G
5403 " " " " G
5406 sound G
5407 " G
5409 " G
5431 crash color flashing WBB
5433 " " " " WBB
5434 color flashing (rnd)sound crasy print WBB
5438 " " " " " BTBB
5440 " " " " " BTBB
5441 " " " " " BTBB
5548 large numbers in left top corner LOCK
5552 " " " " " " " " LOCK
5561 " " " " " " " " LOCK
5571 " " " " " " " " LOCK
5585 checkmate computer self
5589 " " " " " "
5590 " " " " " "
5591 " " " " " "
5592 " " " " " "
5593 " " " " " "
5662 crasy print WBB
5678 " " " WBB
5679 " " " WBB
5697 " " " WBB

5700 crasy print G
 6047 emter xs 2&n LOCK
 (6106) gunfight after sound enter max score &(9)must=less them 1 G
 6357 crasy print G
 6374 " " " G
 6380 " " " G
 6381 " " " G
 6382 " " " G
 6385 " " " G
 6456 got me WBB
 6464 " " WBB
 6467 " " WBB
 6478 " " WBB
 6480 " " WBB
 6485 " " WBB
 6492 " " WBB
 6536 cactus+tree G with() tree G
 6539 tree+memory G " " " G
 6545 " " G with () tree G
 6546 pattern right side G
 6548 tree+memory G with () tree G
 6549 pattern right side G with () tree+memory G
 6550 " " " " G " " " " " G
 (6554) tree G 10 inputA 20 callA change position G mo()lock
 (6555) " G " " " " " " " G " " "
 6556 " + memorytop G with () tree memory center G
 6559 " " " G " " " " " " G
 6560 treetop at -40 memory cemter G with() 2 trees G
 6561 tree + memory top G with () tree memory center G
 6562 tree WBB with () memory tree LOCK
 6566 tree+ memory top G with() tree memory center G
 (6567) tree G
 6568 tree + memory top G with() tree+memory center G
 6569 " " " " G " " " " " " G
 6575 tree G with () change position and number oftrees G

6579 2trees G with () 1tree G
6580 " " G " " " G
6581 top of tree G " " " G
6582 2trees G with () 1tree G
6583 " G " " " G
6584 " G " " " G
6596 memory top G with () memory center G
6598 " " G " " " " G
6638 1 game gunfight G
6639 " " G
6670 gunfight not working add own collor BTBB
6819 box with cactus BTBB
6820 " no " BTBB
6827 gravestones LOCK
6830 " " LOCK
6831 " " LOCK
6892 &(10) up sound WBB
6893 " " " WBB
6894 " " " WBB
6895 " " " WBB
6896 " " " WBB
6900 " " " WBB
6975 bc change to blue WBB
7063 bc+fc change to orange WBB with () bc=7 fc=1 WBB
8497 same as :INPUT G
8499 " " " G
8500 " " " G
8501 " " " G
8502 " " " G
8503 " " " G
8504 " " " G
8505 " " " G
8506 " " " G
8507 " " " G

8508 same as :PRINT G
8525 crusor gone if kp BTBB
8526 " " " BTBB
8529 " " " BTBB
8555 same as :INPUT G
8556 crusor gone keyboard entry is displayed butnot run if kp=run BTBB
8557 " " " " " " " " " " " " " " " " BTBB
8559 same as :LIST G
8560 crusor gone keyboard entry displayed but not run if kp =run BTBB
8561 " " " " " " " " " " " " BTBB
8562 " " " " " " " " " " " " BTBB
8563 " " " " " " " " " " " " BTBB
8564 " " " " " " " " " " " " BTBB
8565 " " " " " " " " " " " " BTBB
8566 " " " " " " " " " " " " BTBB
8574 same as :RUN G
8577 " " " G
8592 crusor gone if kp WBB
8821 puts lime or limes on screen WBB use program.
8822 " " " " " " " " " "
8823 " " " " " " " " " "
8824 " " " " " " " " " "
8825 " " " " " " " " " "
8826 " " " " " " " " " "
8841 " " " " " " " " " "
8842 " " " " " " " " " "
8843 " " " " " " " " " "
8844 " " " " " " " " " "
8845 " " " " " " " " " "
8846 " " " " " " " " " "
8847 " " " " " " " " " "
8848 " " " " " " " " " "
8849 " " " " " " " " " "
8851 " " " " " " " " " "
8852 " " " " " " " " " "
8853 " " " " " " " " " "

| | | | |
|------|--|-------|------|
| 8940 | line | WBB | |
| 8942 | " | WBB | |
| 8960 | " | WBB | |
| 8965 | " | WBB | |
| 8966 | " | WBB | |
| 8967 | " | WBB | |
| 8971 | " | WBB | |
| 8978 | how | BTBB | |
| 9125 | puts crusor at different position on screen | | G |
| 9139 | " " " | " " " | G |
| 9140 | " " " | " " " | G |
| 9141 | " " " | " " " | G |
| 9142 | " " " | " " " | G |
| 9145 | " " " | " " " | G |
| 9146 | " " " | " " " | G |
| 9199 | crusor gone if kp reapears on next lime | | G |
| 9218 | change &(2) | G | |
| 9220 | collor flash | G | |
| 9261 | makes NT=0 | G | |
| 9265 | " " | G | |
| 9267 | " " | G | |
| 9268 | " " | G | |
| 9269 | " " | G | |
| 9270 | " " | G | |
| 9271 | " " | G | |
| 9272 | makes NT=78 | G | |
| 9275 | " " | G | |
| 9276 | " " | G | |
| 9301 | vertical lines &(9)disappears number display if kp | BTBB | |
| 9302 | " " " | " " " | BTBB |
| 9304 | " " " | " " " | BTBB |
| 9305 | " " " | " " " | BTBB |
| 9306 | erase memory prints 1028 as lime number | | BTBB |
| 9307 | " " " | " " " | BTBB |

| | | |
|------|--|------|
| 9308 | erase memory prints 1028 as line number | BTBB |
| 9309 | " " " " " | BTBB |
| 9310 | erase memory | BTBB |
| 9311 | " " | BTBB |
| 9312 | " " | BTBB |
| 9313 | " " | BTBB |
| 9314 | " " | BTBB |
| 9315 | " " | BTBB |
| 9316 | " " | BTBB |
| 9333 | " " | BTBB |
| 9352 | " " | BTBB |
| 9353 | game over | LOCK |
| 9369 | like print | G |
| 9379 | crusor gone if kp=RUN | BTBB |
| 9392 | prints m waits for input but does mot go to memory | G |
| 9445 | <u>interesting see note 1</u> | |
| 9467 | prints sorry | BTBB |
| 9468 | " " | BTBB |
| 9469 | " " | BTBB |
| 9471 | " " | BTBB |
| 9472 | " " | BTBB |
| 9473 | " " | BTBB |
| 9564 | like CLEAR | G |
| 9567 | puts crusor to top of screen | G |
| 9569 | " " " " " | G |
| 9570 | " " " " " | G |
| 9571 | " " " " " | G |
| 9573 | " " " " " | G |
| 9574 | " " " " " | G |
| 9575 | " " " " " | G |
| 9576 | " " " " " | G |
| 9577 | " " " " " | G |
| 9578 | " " " " " | G |
| 9582 | prints HOW | BTBB |
| 9592 | prints WHAT 13?? BALLY BASIC | BTBB |

9627 same as LIST G
 9657 imteresting WBB
 9658 " " WBB
 9659 " " WBB
 9660 " " WBB
 9662 prints HOW WBB
 9667 imteresting WBB try adding things after the number
 9668 " " WBB " " " " "
 9670 " " WBB " " " " "
 9671 " " WBB " " " " "
 9672 " " WBB " " " " "
 9673 " " WBB " " " " "
 9674 " " WBB " " " " "
 9675 " " WBB " " " " "
 9676 " " WBB " " " " "
 9677 " " WBB " " " " "
 9692 same as PRINT G
 9720 " " " G
 9724 cursor 1 space from original position G
 9726 " " " " " " G
 9742 prints call number G
 9744 same as PRINT G
 9745 " " " G
 9746 " " " G
 9747 prints HOW BTBB
 9873 imteresting BTBB
 9930 " " " WBB only with 10 INPUT A 20 CALL A
 10026 waiting for input after input WBB
 10027 " " " " " " G
 10034 prints a number then ??? or other letters and words BTBB or WBB
 10037 " " " " " " " " " BTBB OR WBB
 10067 prints caracters as above them waits for input input=NT WBB
 10068 " " " " " " " " WBB
 10069 " " " " " " " " WBB
 10070 " " " " " " " " WBB

10071 prints caracters then waits for input WBB
 10072 waiting for input them crusor mouves to top left BTBB
 10073 " " " " " " " " WBB
 10074 " " " " " " " " WBB
 10075 " " " " " " " " WBB
 10077 waiting for input*2 collor soundmemory LOCK
 10078 " " " 1 " " " " LOCK
 10079 " " " " " " " " LOCK
 10086 interesting enter number and go watch screen press some keys BTBB
 10088 as abouve +collor +memory BTBB
 10089 " " " " " " BTBB
 10097 sound WBB
 10100 prints m after imput WBB
 10212 prints HOW BTBB
 10820 prints !line G
 10856 prints 2limes G
 10924 prints WBB then a string of numbers if kp=go HOWBB if kp=run WBB
 10940 sound G
 11005 moves crusor G
 11011 prints WHAT 13?? BALLY BASIC BTBB
 11018 moves crusor G
 11019 " " " G
 11020 " " " G
 11021 " " " G
 11022 " " " G
 11029 waiting for imput press some letter or number several times if kp= go RESET BTBB
 11034 prints called number G
 11035 " " " " G
 11036 " " " " G
 11037 " " " " G
 11038 interesting LOCK
 11039 prints -call number G
 11040 " " " G
 11041 " " " G
 11042 " " " G
 11043 " " " G

| | | |
|-------|----------------------------------|-----------------------------|
| 11044 | prints ?11043 | G |
| 11045 | prints ?11045 | G |
| 11046 | prints ?11046 | G |
| 11095 | waiting for input | WBB |
| 11096 | prints 7949 | WBB whith program 21307 WBB |
| 11097 | waiting for input | WBB |
| 11098 | prints 177 | WBB with program 21343 WBB |
| 11099 | " 78 | WBB " " " 21408 WBB |
| 11100 | " 92 | WBB " " " 21340 WBB |
| 11101 | " 3421 | WBB " " " 15197 WBB |
| 11103 | " -20129 | WBB " " " 24415 WBB |
| 11104 | " 20064 | WBB " " " -24480 WBB |
| 11105 | " 11105 | WBB " " " 11105 WBB |
| 11106 | " 11106 | G " " " 11106 G |
| 11107 | " 11107 | G " " " 11107 G |
| 11108 | " 11108 | G " " " 11108 G |
| 11110 | moves erusor | G |
| 11111 | " " " | G |
| 11115 | prints 1:30or 1:300000000 | WBB or LOCK |
| 11135 | " 1:30242424242424 | LOCK |
| 11193 | puts caracter on screen if KP=GO | WBB if KP=RUN BTBB |
| 11194 | " " " " | " " " " |
| 11198 | " " " " | " " " " |
| 11199 | " " " " | " " " " |
| 11200 | " " " " | " " " " |
| 11201 | " " " " | " " " " |
| 11202 | " " " " | " " " " |
| 11203 | " " " " | " " " " |
| 11204 | " " " " | " " " " |
| 11206 | " " " " | " " " " |
| 11207 | " " " " | " " " " |
| 11210 | " " " " | " " " " |
| 11211 | " " " " | " " " " |
| 11217 | " " " " | " " " " |
| 11218 | " " " " | " " " " |

11219 puts caracter on screen if KP=GO WBB ifKP=RUN BTBB
11220 " " " " " " "
11221 " " " " " " "
11222 " " " " " " "
11223 " " " " " " "
11234 " crusor " " " " " "
11316 moves crusor to different locations on screen G
11317 " " " " " " "
11318 " " " " " " "
11501 " " " " " " "
11502 " " " " " " "
11503 " " " " " " "
11504 " " " " " " "
11505 " " " " " " "
11506 " " " " " " "
11507 " " " " " " "
11508 " " " " " " "
11509 " " " " " " "
11510 " " " " " " "
11511 " " " " " " "
11513 " " " " " " "
11514 " " " " " " "
11515 " " " " " " "
11516 " " " " " " "
11517 " " " " " " "
11518 " " " " " " "
11519 " " " " " " "
11526 " " " " " " "
11528 " " " " " " "
11540 " " " " " " "
11546 " " " " " " "
11547 " " " " " " "
11549 " " " " " " "
11551 " " " " " " "
11552 " " " " " " G

11553 moves cursor to different locations on screen G
 11554 " " " " " " " " G
 11555 " " " " " " " " G
 11559 " " " " " " " " G
 11594 " " " " " " " " G
 11596 " " " " " " " " G
 11597 " " " " " " " " G
 11598 " " " " " " " " G
 11599 " " " " " " " " G
 11600 " " " " " " " " G
 11601 " " " " " " " " G
 11648 " " " " " " " " G
 11650 " " " " " " " " G
 11651 " " " " " " " " G
 11652 " " " " " " " " G
 11653 " " " " " " " " G
 11723 waiting for input if KP BC=78 WBB
 11724 " " " " " " WBB
 11726 " " " " BC=36 LOCK
 11727 " " " " " " " " RESET BTBB
 11768 BC=78 G
 11769 " " G
 11771 " " G
 11778 " " G
 11807 prints 10 waitimg for imput. like pressing WORDS GO G
 11808 " " " " " " " " " " G
 11809 " " " " " " " " " " G
 11810 interesting WBB
 11836 some delay for 2 secoms G
 11850 print 1 lime them print BALLY BASIC. like pressing RUN G
 11860 " " " " " " " " " " G
 11861 " " " " " " " " " " G

 11862 up to 32767 either shows mothing or part of calculator
 or game over or lock.

